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CLEANING MILKING MACHINES



MILKING MACHINES are playing a larger and larger part in the economics of dairying. For this reason care must be taken in sanitation, so that nothing will impede their continued and increasing use.

Milking machines must be thoroughly washed and sterilized if clean milk of a low bacterial content is to be produced.

The Department of Agriculture is conducting investigations in the cleaning of milking machines, and from experience gained so far has found the method outlined in this bulletin to be both simple and effective.

The method applies particularly to machines of the vacuum-pipe-line type, in which the milk is drawn through rubber tubes. The same principle of cleaning applies to other types, but it may be necessary to vary details.

CLEANING MILKING MACHINES.

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NECESSITY FOR PROPER CLEANING.

THE use of mechanical milkers is becoming more common in the production of market milk, and the extension of their use brings up the problem of keeping the machines clean. Unsterile dairy utensils are one of the chief means by which fresh milk is contaminated by bacteria. For this reason each additional piece of apparatus with which milk comes in contact may be an additional source of contamination. If the milking machines are washed and sterilized properly, all well and good; but often they are not properly cared for and are the direct cause of large numbers of bacteria in milk.

The ability of well-informed and careful dairymen to produce clean milk with milking machines is shown by the fact that certified milk is being produced with them. The same is true of market milk of good grade drawn with machines, under ordinary farm conditions. There is no short cut, however, to cleanliness; clean milk can not be obtained by using neglected machines. To attain this objective, machines must be thoroughly and regularly washed and sterilized.

The Department of Agriculture is conducting investigations in the cleaning of milking machines, and from the experience gained so far it advocates a method of cleaning which is simple and effective in producing milk uniformly low in numbers of bacteria.

POINTS WHICH REQUIRE CAREFUL ATTENTION.

Owing to the construction of milking machines, persistent care must be exercised in cleaning them. Each of the following points requires careful attention:

Rubber tubing, including glass unions.	Head.
Teat cups and inflations.	Valves.
Claws.	Moisture traps.
Pail.	Vacuum lines.

Definite cleaning instructions should be followed by each milking-machine user.

HEAT STERILIZATION FOR MILKING MACHINES.

The heat method of sterilizing milking machines, which is presented in this bulletin, was tried on a number of farms and proved successful. Its effectiveness is shown by the following results obtained on samples of machine-drawn milk at farms where this method was used.

Samples taken at 13 farms using various methods other than heat for the purpose of sterilizing the machines had an average bacterial count of 257,900 per cubic centimeter for 74 samples.¹ Samples taken at the same farms when the heat method of sterilizing the machines was used had an average bacterial count of 19,300 per cubic centimeter for 261 samples.

Samples of machine-drawn milk taken at a total of 20 farms using this method for sterilizing the machines had an average bacterial count of 13,750 per cubic centimeter for 622 samples, and 376 of the samples had a count of 10,000 per cubic centimeter or less.

The effectiveness of heat sterilization for cleaning milking machines on some representative individual farms is shown in the following table:

TABLE 1.—*Effectiveness of heat-sterilization method of cleaning milking machines.*

Farm No.	Number of samples.	Period covered.	Average bacterial count per cubic centimeter.	Farm No.	Number of samples.	Period covered.	Average bacterial count per cubic centimeter.
1	188	2 years....	12,700	4	79	4 months..	11,500
2	31	2 months..	23,100	5	45	2 months..	5,100
3	45	3 weeks...	17,400	6	74	5 months..	5,600

Bacterial counts obtained on comparative tests made with machines sterilized by this method, and others sterilized in a chlorinated-lime solution, were in favor of the heat method for sterilizing.

All bacterial counts are of samples taken under actual farm conditions direct from the machine pail. All machines were handled entirely by the owner or his employees according to a set of directions left with them. The average age of samples when count was made was about 12 hours. Standard methods were used in making the bacteriological analyses.

EFFECT OF HEAT ON THE RUBBER PARTS.

The effect of heat on the rubber parts has not yet been fully determined by this department. So far, however, the temperatures used (160° to 170° F.) have been but slightly if any more detrimental to the life of the rubber than other methods of sterilization.

Some users have obtained as long as 17 weeks' wear out of the teat-cup liners when using this method, while others have obtained only 6 weeks' service. This variation can be attributed to four things:

1. The grade of rubber used in making the liners.
2. The number of cows milked with a set of rubbers.
3. The condition of rubbers when discarded.
4. Care and cleanliness of rubbers.

1. The life of the rubber liners and mouthpieces varies considerably under exactly the same care and use, due undoubtedly to the difference in grade of rubber.

2. The number of cows milked with the machine and the number of milkings each day also affect the life of the rubber. The oftener the teat-cup rubbers are used, the sooner they wear out.

¹ The term "bacterial count" means the number of bacteria found in a specified quantity of milk, usually a cubic centimeter. A cubic centimeter equals about 16 drops

3. There is a great difference in the degree of wear at which the rubbers are discarded by various operators. Some operators replace rubber parts that are still in good enough condition to last several weeks. These operators are usually those who have large numbers of cows to milk. They say that the time saved in milking by replacing rubbers frequently more than pays them for the additional expense of new rubbers. In no case, however, should old, cracked, or split rubbers be used.

4. It is necessary that the rubbers be thoroughly cleaned before sterilizing, as butterfat has a deleterious effect on them at temperatures used for sterilizing and shortens their life materially.

The temperatures recommended have no apparent effect on the length of life of the short or the long rubber tubing.

HOW TO CLEAN AND STERILIZE MILKING MACHINES, TOLD IN PICTURES.

Steps in the care and use of milking machines are portrayed in the accompanying pictures (Figures 1 to 13).



FIG. 1.—Immediately after milking, the machines are rinsed with cold or lukewarm water drawn through the machines by vacuum. The flow should be broken occasionally by pulling the teat cups out of the water and then immediately immersing them again. This is done 10 or 12 times.

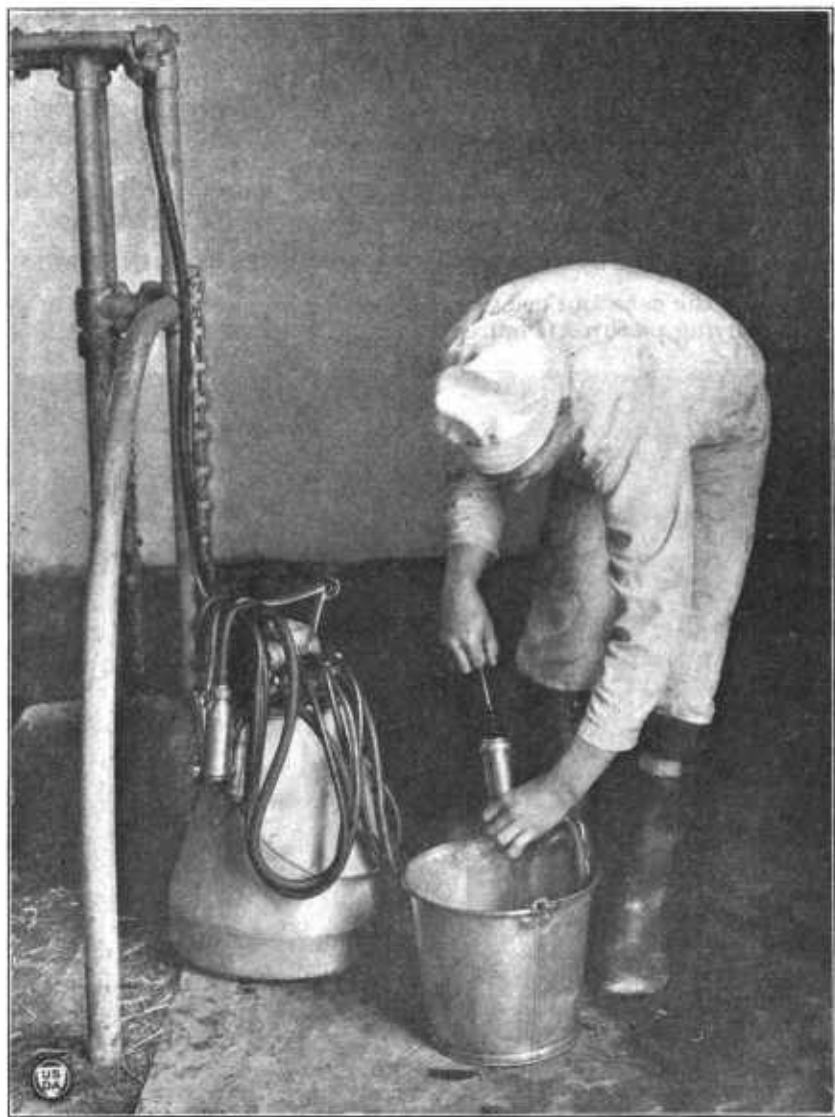


FIG. 2.—Repeat the rinsing process, using hot water containing washing powder. Teat cups and tubing are washed with a brush at this time.



FIG. 3.—Then rinse the machines with clean water drawn through by vacuum.

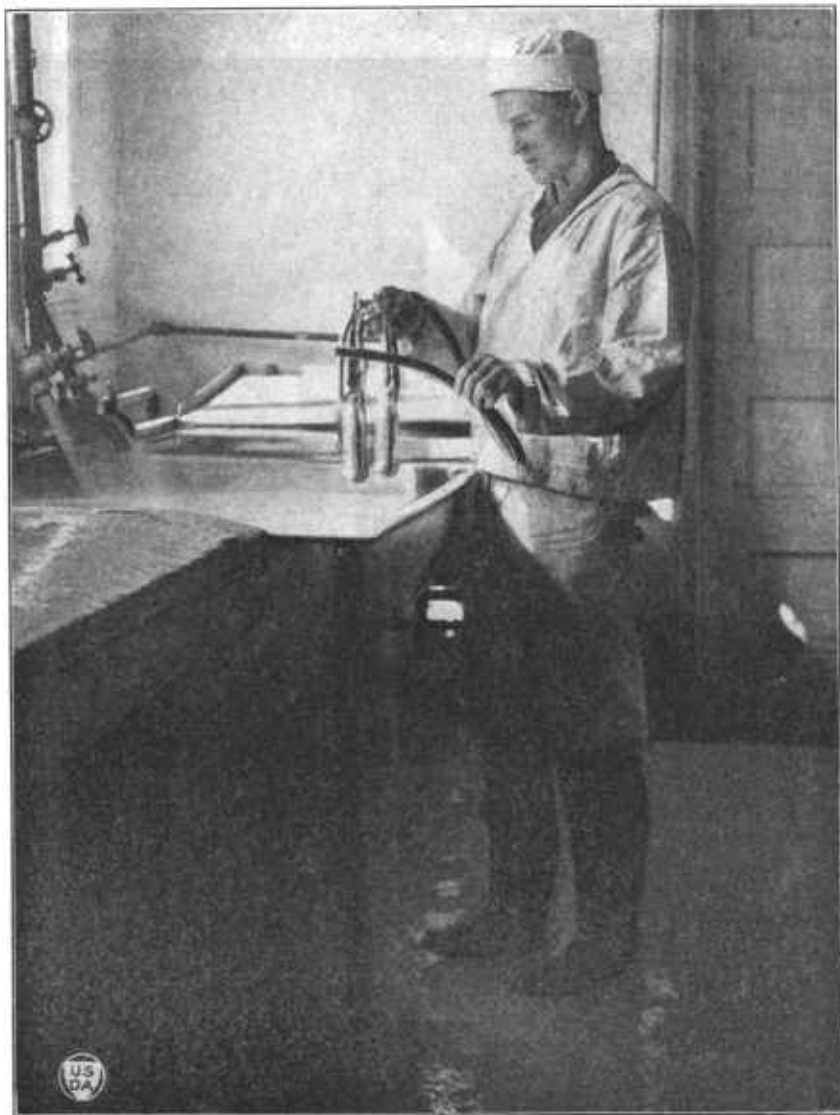


FIG. 4.—The long milk tube with claw and teat cups is then detached from the head of the pail. Air tubes (on machines of inflation type) are plugged, and the whole is placed in a tank or a can of clean water, care being taken that all parts are entirely submerged.

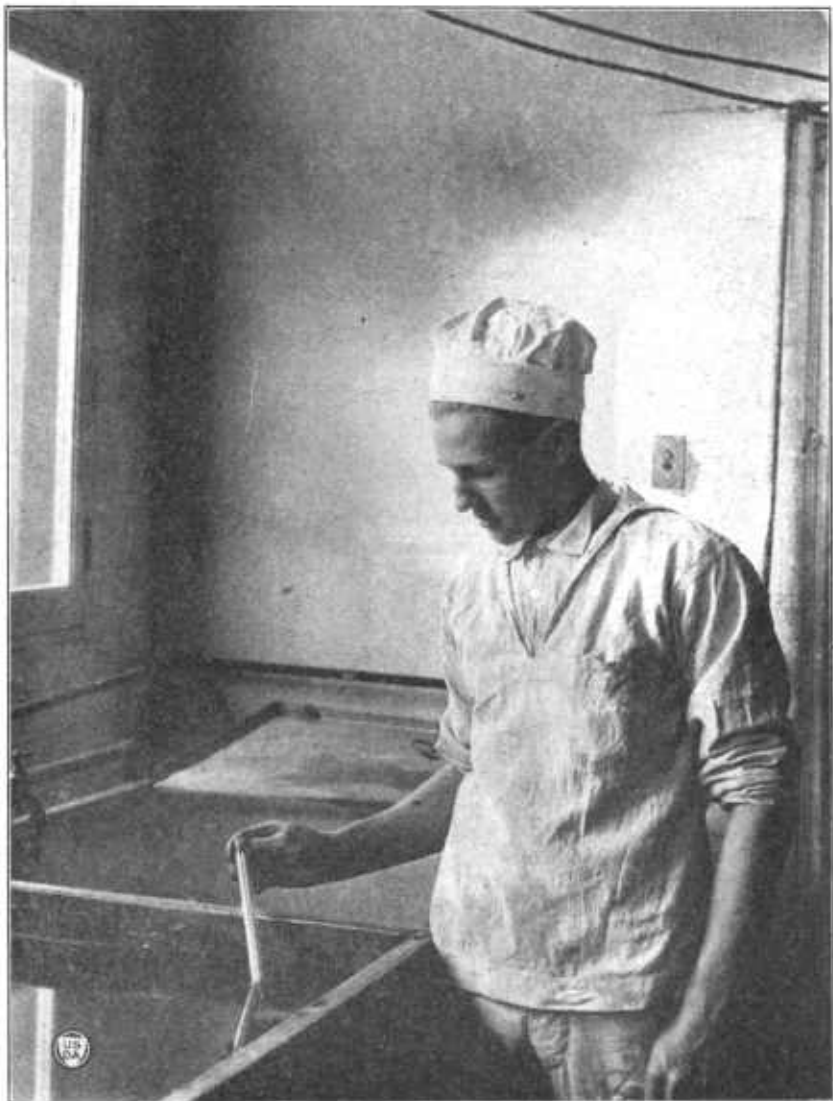


FIG. 5.—The water is then heated, preferably with steam, to a temperature of from 160° to 170° F. and held there from 15 to 30 minutes. The water is then allowed to cool and the parts to remain there until the next milking. A covered tank will usually hold the temperature above 160° F. for the required length of time, if heated to 165° or 170° F.

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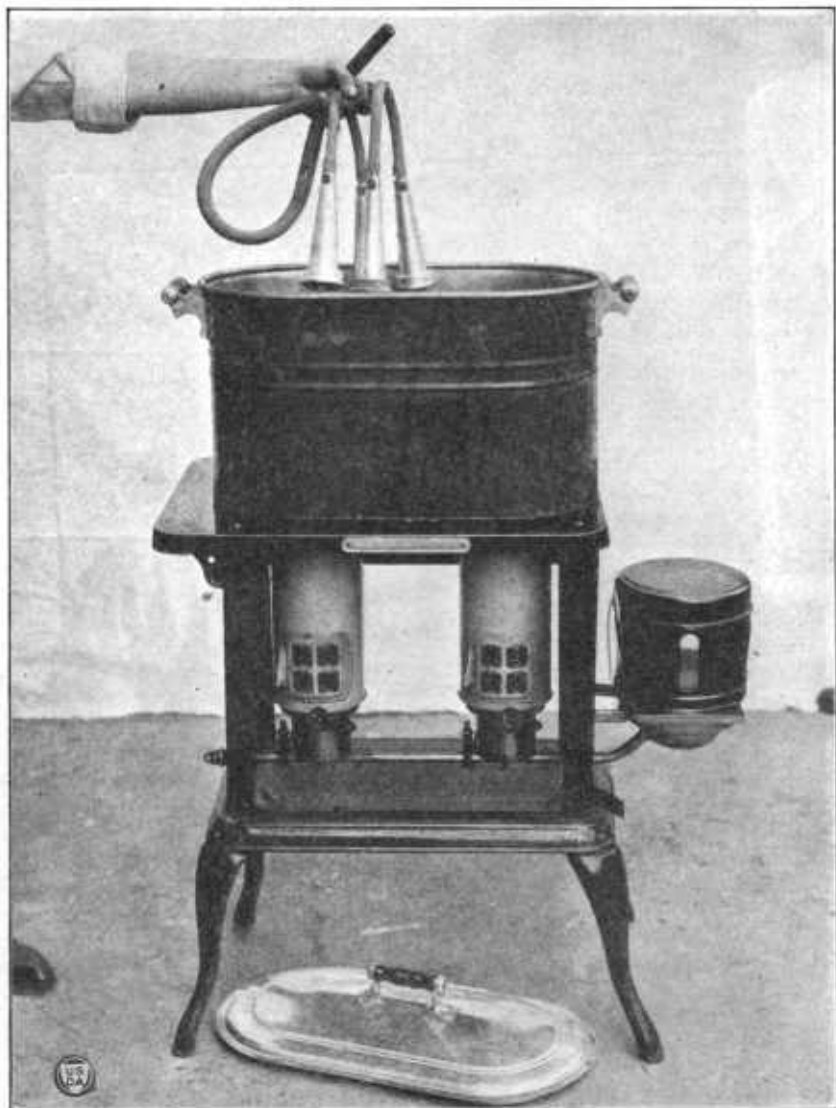


FIG. 6.—Where steam is not available for heating, the water may be heated in a wash boiler on a stove. If the water is so heated, it is best not to place the rubber parts in the water until the proper temperature has been reached and the boiler removed from the stove; otherwise the rubber parts may be injured by coming into too close contact with the heating medium.

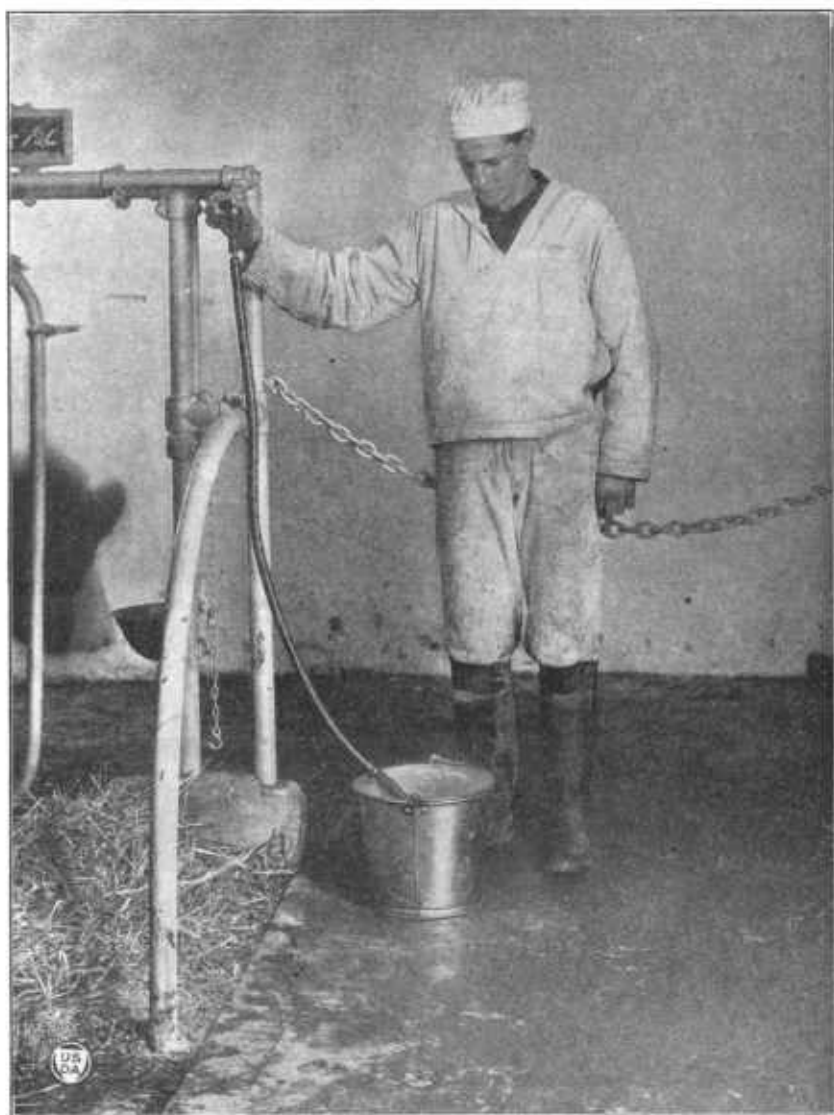


FIG. 7.—The vacuum line should be cleaned about every two weeks by drawing hot water, containing washing powder, through it with vacuum. If milk is drawn into the vacuum line, the pipe should be cleaned immediately after milking.



FIG. 8.—Twice each week the machines should be taken entirely apart and washed thoroughly with brushes and hot water containing washing powder.

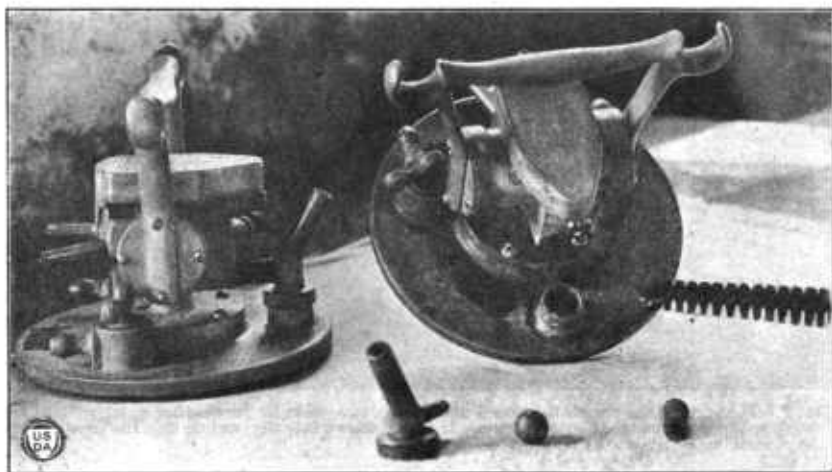


FIG. 9.—The moisture trap or check valve on the head of the machine (cover of pail) should be cleaned every day.



FIG. 10.—Milking-machine pails and covers should be thoroughly washed after every milking and then sterilized.



FIG. 11.—Milking-machine pails and covers should be sterilized, preferably with steam. Pulsators and electric motor should be removed before sterilizing.

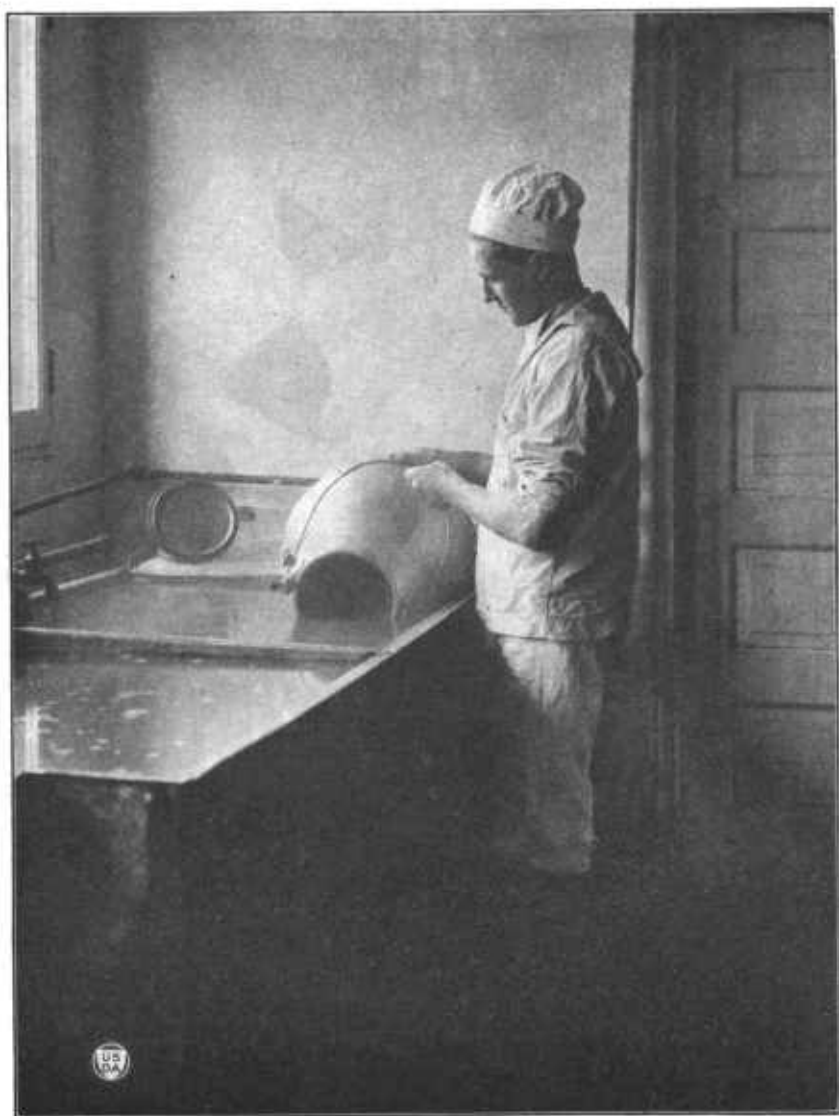


FIG. 12.—If steam is not available, the covers and pails should be sterilized by immersing in boiling water for 5 minutes.

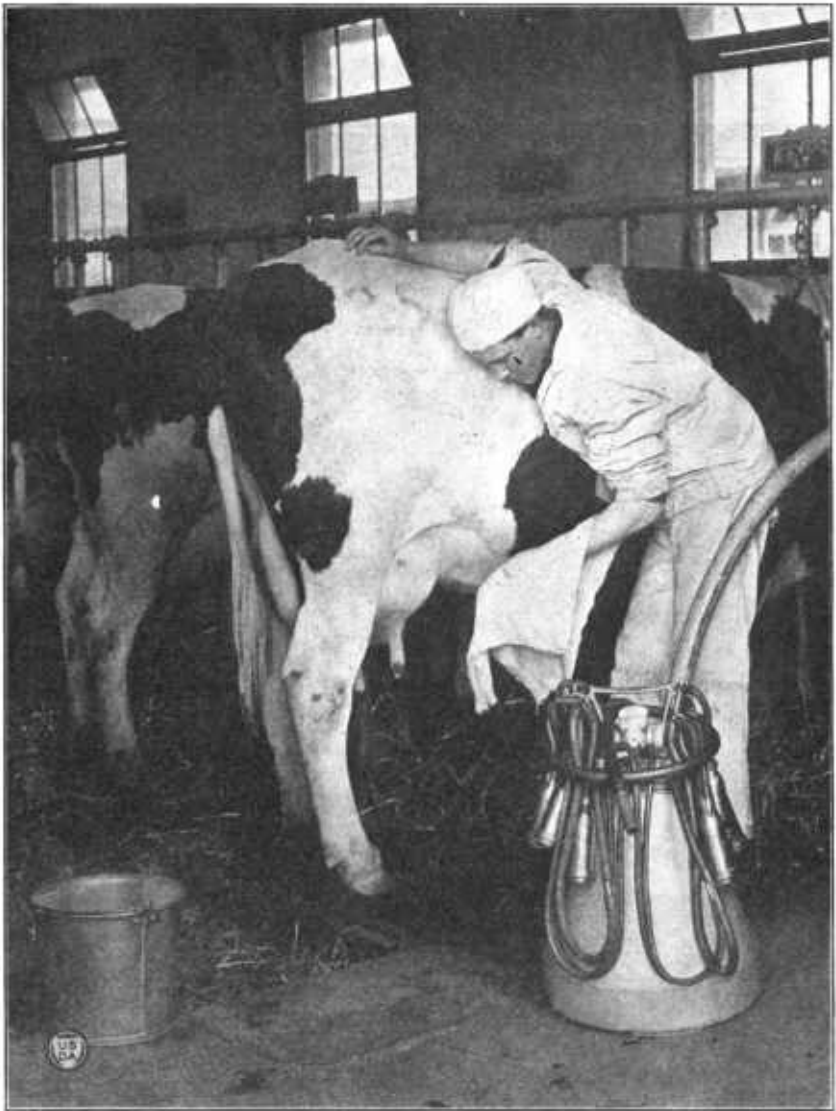


FIG. 13.—The cleaned machine is assembled ready for use. Before beginning milking, the udder and flanks of the cow should be cleaned by wiping with a clean, damp cloth.

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